

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT7529172

SUBMISSION TYPE:	RESUBMISSION
NATURE OF CONVEYANCE:	ASSIGNMENT
RESUBMIT DOCUMENT ID:	507393884

CONVEYING PARTY DATA

Name	Execution Date
DEEPMAP INC.	08/25/2021

RECEIVING PARTY DATA

Name:	NVIDIA CORPORATION
Street Address:	2788 SAN THOMAS EXPRESSWAY
City:	SANTA CLARA
State/Country:	CALIFORNIA
Postal Code:	95051

PROPERTY NUMBERS Total: 76

Property Type	Number
Patent Number:	11068516
Patent Number:	11280609
Application Number:	16208026
Patent Number:	11041730
Patent Number:	11151394
Application Number:	16810796
Patent Number:	11367208
Patent Number:	11391578
Patent Number:	11340082
Application Number:	16910742
Application Number:	16908251
Application Number:	16919222
Application Number:	16919137
Application Number:	16919131
Application Number:	16915682
Application Number:	16905334
Application Number:	16919128
Application Number:	16904238
Application Number:	16904259

PATENT

Property Type	Number
Application Number:	16915897
Application Number:	16911622
Application Number:	16901655
Application Number:	16898005
Application Number:	16898750
Application Number:	16920126
Application Number:	16920105
Application Number:	16920141
Application Number:	16920128
Application Number:	16904504
Application Number:	16919125
Application Number:	16918672
Application Number:	17079057
Patent Number:	10962366
Application Number:	17183031
Application Number:	17183053
Patent Number:	10531004
Patent Number:	10897575
Patent Number:	10841496
Patent Number:	10436885
Patent Number:	11375119
Patent Number:	10498966
Patent Number:	10469753
Patent Number:	10999511
Patent Number:	10928207
Patent Number:	10401500
Patent Number:	10359518
Patent Number:	10267634
Patent Number:	10267635
Patent Number:	10670416
Patent Number:	10222211
Patent Number:	10527417
Patent Number:	11162788
Application Number:	16290480
Patent Number:	11340355
Patent Number:	10527734
Patent Number:	10928523
Patent Number:	11353589

Property Type	Number
Patent Number:	10859395
Patent Number:	10545029
Patent Number:	11209548
Application Number:	16721516
Application Number:	16733143
Patent Number:	10353931
Patent Number:	10527514
Patent Number:	10422639
Patent Number:	10837773
Patent Number:	10309778
Patent Number:	10598489
Patent Number:	10309777
Patent Number:	10474164
Patent Number:	10845820
Patent Number:	11365976
Patent Number:	10794711
Patent Number:	10429194
Patent Number:	10801845
Patent Number:	10816346

CORRESPONDENCE DATA

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ATTORNEY DOCKET NUMBER:	D4177.0
NAME OF SUBMITTER:	R. BURNS ISRAELSEN
SIGNATURE:	/R. Burns Israelsen/
DATE SIGNED:	09/09/2022

Total Attachments: 9

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Exhibit B

Patent Assignment

This Patent Assignment ("Patent Assignment") is effective as of August 25, 2021, and is between **DEEPMAP INC.** ("ASSIGNOR") and **Nvidia Corporation**, a Delaware corporation having a place of business at 2788 San Thomas Expressway, Santa Clara, CA 95051 ("ASSIGNEE").

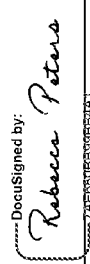
For good and valuable consideration, the receipt of which is hereby acknowledged, ASSIGNOR does hereby sell, assign, transfer, convey and set over the entire right, title and interest to ASSIGNEE, in and to the patents and patent applications listed in Schedule 1 ("Assigned Patents").

ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks, and other respective patent offices or governmental agencies worldwide, to issue any and all Letters Patent (or patents or certificates of invention, as the case may be) that may be granted upon any of the Assigned Patents to ASSIGNEE as assignee of the entire interest.

In Witness Whereof, the parties, by their duly authorized representatives, have executed this Patent Assignment.

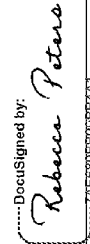
ASSIGNOR

ASSIGNEE

By: /  /
DocuSigned by:
Rebecca Peters
7AE630B3936B5A1...

Name: Rebecca Peters

Title: Secretary

By: /  /
DocuSigned by:
Rebecca Peters
7AE630B3936B5A1...

Name: Rebecca Peters

Title: Vice President, Deputy General Counsel and
Assistant Secretary

(Exhibit B cont.)

Schedule 1

Assigned Patents

D4177.1.0001.W001	DISTRIBUTED PROCESSING OF POSE GRAPHS FOR GENERATING HIGH DEFINITION MAPS FOR NAVIGATING AUTONOMOUS VEHICLES	Chen Chen	05 Mar 2020	PCT/US2020/021293	9/10/2020	WO/2020/181153		PCT	Published	05 Nov 2021	05 Mar 2019	US	Non Provisional	Secondary	National Phase deadline Oct 5, 2021
D4177.1.0029.US04	HIGH DEFINITION MAP AND ROUTE STORAGE MANAGEMENT SYSTEM FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	10 Feb 2020	16/786,483	9/10/2020	US 2020-0284658 A1		US	Allowed		30 Dec 2016	US	Non Provisional	Continuation	Issue fee due July 5, 2021
D4177.1.0035.EP01	ITERATIVE CLOSEST POINT PROCESS BASED ON LIDAR WITH INTEGRATED MOTION ESTIMATION FOR HIGH DEFINITIONS MAPS	Mark D. Wheeler, Denik Schroeder, Chen Chen, Jeffrey Minoru Adachi, Greg Coombe	16 Nov 2018	18879500.9				EP	Application	16 Nov 2021	17 Nov 2017	US	Non Provisional	Designated PCT	Annuity Deadline Nov 16, 2021
D4177.1.0041.US02	HIGH-DEFINITION PRIOR MAPS AND LOCALIZATION FOR AUTONOMOUS ROAD VEHICLES	Baoan Liu, Tian Lan, Kezhao Chen	12 Oct 2020	16/090,417				US	Application	12 Oct 2021			Provisional	Priority	Provisional Conversion deadline Oct. 12, 2021
D4177.1.0030.US08	DETECTION OF MISALIGNMENT HOTSPOTS FOR HIGH DEFINITION MAPS FOR NAVIGATING AUTONOMOUS VEHICLES	Mark D. Wheeler, Chen Chen, Liang Zou	28 Dec 2017	15/857,609	7/5/2018	US 2018-0186041 A1		US	Published		30 Dec 2016	US	Non Provisional	Secondary	Final Office Action Response due Aug 12, 2021
D4177.1.0033.US02	HIGH DEFINITION MAP BASED LOCALIZATION OPTIMIZATION	Mark D. Wheeler	03 Dec 2018	16/708,026	7/4/2019	US 2019-0204092 A1		US	Published		01 Dec 2017	US	Non Provisional	Secondary	Final Office Action Response due July 14, 2021
D4177.1.0037.US03	REVERSE RENDERING OF AN IMAGE BASED ON HIGH DEFINITION MAP DATA	Mark D. Wheeler, Gil Colgrate	01 Mar 2019	16/290,489	9/5/2019	US 2019-0271548 A1		US	Allowed		02 Mar 2018	US	Non Provisional	Secondary	Deadline to file a divisional or continuation Jun 21, 2021
D4177.1.0027.EP01	HIGH DEFINITION MAP UPDATES	Mark D. Wheeler, Xiaqing Wu, Wei Luo	29 Dec 2017	17888334.4	11/6/2019	3563265		EP	Allowed	29 Dec 2021	30 Dec 2016	US	Non Provisional	Designated PCT	European Validation fee Sept 2, 2021 Annuity Deadline Dec 29, 2021
D4177.1.0004.US02	IDENTIFYING DYNAMIC OBJECTS IN A POINT CLOUD	Denik Schroeder	28 Jun 2020	16/910,677	12/24/2020	US 2020-0401816 A1		US	Allowed			US	Non Provisional	Secondary	Issue fee Due Sept 9, 2021

0417/1.000U502	US DISTRIBUTED PROCESSING OF POSE GRAPHS FOR GENERATING HIGH DEFINITION MAPS FOR NAVIGATING AUTONOMOUS VEHICLES	Chen Chen	05 Mar 2020	16/910,796	9/10/2020	US 2020-028490 A1	US	Published		US	05 Mar 2019	US	Non Provisional	Secondary	
0417/1.000U001	DISTRIBUTED PROCESSING OF POSE GRAPHS FOR GENERATING HIGH DEFINITION MAPS FOR NAVIGATING AUTONOMOUS VEHICLES	Chen Chen	05 Mar 2020	PCT/US2020/031293	9/10/2020	WO/2020/181153	PCT	Published		US	05 Nov 2021	US	Non Provisional	Secondary	National Phase deadline Oct. 5, 2021
0417/1.000U502	IMAGE BASED KEYPOINT GENERATION	Denk Schroeter, Ronghua Zhong, Di Zeng, Mingai Wu	25 Jun 2020	16/912,549	12/31/2020	US 2020-0410702 A1	US	Published		US	25 Jun 2019	US	Non Provisional	Secondary	
0417/1.000U001	IMAGE BASED KEYPOINT GENERATION	Denk Schroeter, Ronghua Zhong, Di Zeng, Mingai Wu	25 Jun 2020	PCT/US2020/039703	12/30/2020	WO/2020/054222	PCT	Published		US	25 Feb 2022	US	Non Provisional	Secondary	National Phase deadline Dec 25, 2021
0417/1.000U502	USING MEASURE OF CONSTRAINEDNESS IN HIGH DEFINITION MAPS FOR LOCALIZATION OF AUTONOMOUS VEHICLES	Denk Schroeter, Di Zeng, Mingai Wu	02 Jul 2020	16/919,141	1/7/2021	US 2021-003404 A1	US	Published		US	02 Jul 2019	US	Non Provisional	Secondary	
0417/1.000U503	DETERMINING LOCALIZATION CONFIDENCE OF VEHICLES BASED ON CONVERGENCE RANGES	Mark D. Wheeler, Denk Schroeter	02 Jul 2020	16/919,150	1/7/2021	US 2021-003403 A1	US	Published		US	02 Jul 2019	US	Non Provisional	Secondary	
0417/1.000U001	DETERMINING LOCALIZATION CONFIDENCE OF VEHICLES BASED ON CONVERGENCE RANGES	Mark D. Wheeler, Denk Schroeter	02 Jul 2020	PCT/US2020/040793	1/7/2021	WO/2021/003455	PCT	Published		US	02 Mar 2022	US	Non Provisional	Secondary	
0417/1.000U502	IDENTIFYING DYNAMIC OBJECTS IN A POINT CLOUD	Denk Schroeter	24 Jun 2020	16/910,677	12/24/2020	US 2020-0401816 A1	US	Published		US	24 Jun 2019	US	Non Provisional	Secondary	
0417/1.000U502	DETERMINING WEIGHTS OF POINTS OF A POINT CLOUD BASED ON CHARACTERISTICS OF STRUCTURES	Denk Schroeter	24 Jun 2020	16/910,742	12/24/2020	US 2020-0401817 A1	US	Published		US	24 Jun 2019	US	Non Provisional	Secondary	
0417/1.000U001	DETERMINING WEIGHTS OF POINTS OF A POINT CLOUD BASED ON GEOMETRIC FEATURES	Denk Schroeter	24 Jun 2020	PCT/US2020/039468	12/30/2020	WO/2020/054080	PCT	Published		US	24 Feb 2022	US	Non Provisional	Secondary	National Phase deadline Dec 24, 2021
0417/1.000U502	ANNOTATING HIGH DEFINITION MAP POINTS WITH MEASURE OF USEFULNESS FOR LOCALIZATION	Di Zeng, Mingai Wu	22 Jun 2020	16/908,351	12/24/2020	US 2020-0401845 A1	US	Published		US	21 Jun 2019	US	Non Provisional	Secondary	
0417/1.000U502	INTERACTIVE SENSOR CALIBRATION FOR AUTONOMOUS VEHICLES	Chen Chen, Ziqiang Huang	02 Jul 2020	16/919,222	1/7/2021	US 2021-0033683 A1	US	Published		US	03 Jul 2019	US	Non Provisional	Secondary	
0417/1.000U502	DETERMINATION OF LANE CONNECTIVITY AT TRAFFIC INTERSECTIONS FOR HIGH DEFINITION MAPS	Xiangdong Han, MingCui	02 Jul 2020	16/919,137	1/7/2021	US 2021-0031877 A1	US	Published		US	02 Jul 2019	US	Non Provisional	Secondary	
0417/1.000U001	DETERMINATION OF LANE CONNECTIVITY AT TRAFFIC INTERSECTIONS FOR HIGH DEFINITION MAPS	Xiangdong Han, MingCui	02 Jul 2020	PCT/US2020/040787	1/7/2021	WO/2021/003452	PCT	Published		US	02 Mar 2022	US	Non Provisional	Secondary	
0417/1.000U502	GENERATING TRAINING DATA FOR DEEP LEARNING MODEL FOR BUILDING HIGH DEFINITION MAPS	Lin yong	02 Jul 2020	16/919,131	1/7/2021	US 2021-0054021 A1	US	Published		US	05 Jul 2019	US	Non Provisional	Secondary	
0417/1.000U001	GENERATING TRAINING DATA FOR DEEP LEARNING MODEL FOR BUILDING HIGH DEFINITION MAPS	Lin yong	02 Jul 2020	PCT/US2020/040791	1/14/2021	WO/2021/003117	PCT	Published		US	05 Mar 2022	US	Non Provisional	Secondary	

D04177.1001U0502	DEEP LEARNING-BASED DETECTION OF GROUND FEATURES USING A HIGH DEFINITION MAP	Yu Zheng, Lin Yang, Rezhith Pesala	29 Jun 2020	16/915,682	12/31/2020	US 2020-0408539 A1	US	Published	28 Jun 2019	US	Non Provisional	Secondary	
D04177.1001U0502	ADAR-BASED DETECTION OF TRAFFIC SIGNS FOR NAVIGATION OF AUTONOMOUS VEHICLES	Yu Zheng, Lin Yang, Derek Thomas Miller	18 Jun 2020	16/925,334	12/24/2020	US 2020-0407823 A1	US	Published	19 Jun 2019	US	Non Provisional	Secondary	
D04177.1001W0001	ADAR-BASED DETECTION OF TRAFFIC SIGNS FOR NAVIGATION OF AUTONOMOUS VEHICLES	Yu Zheng, Lin Yang, Derek Miller	19 Jun 2020	PCT/US1020/038831	12/24/2020	WO/2020/257773	PCT	Published	19 Feb 2022	US	Non Provisional	Secondary	National Phase Deadline Dec 19, 2021
D04177.1001U0502	ANNOTATING POINT CLOUD DATA WITH COLOR CAPTURED BY CAMERA OF AVEHICLE	Chen Chen, Hengyi Huang, Lang Zou, Gil Colgate					US	To Be Filed	19 Jun 2019	US	Non Provisional	Secondary	
D04177.1001U0502	VEHICLE DETECTION IN HIGH DEFINITION MAPS	Chirag Majithia					US	To Be Filed	03 Jul 2019	US	Non Provisional	Secondary	
D04177.1001U0502	TRAINING DATA GENERATION FOR DYNAMIC OBJECTS USING HIGH DEFINITION MAP DATA	Chirag Majithia	02 Jul 2020	16/919,128	1/7/2021	US 2021-0201891 A1	US	Published	03 Jul 2019	US	Non Provisional	Secondary	
D04177.1001W0001	TRAINING DATA GENERATION FOR DYNAMIC OBJECTS USING HIGH DEFINITION MAP DATA	Chirag Majithia	05 Jul 2020	PCT/US1020/040942	1/7/2021	WO/2021/003487	PCT	Published	03 Mar 2022	US	Non Provisional	Secondary	
D04177.1001U0502	NEAREST NEIGHBOR SEARCH USING COMPRESSED OCTREES REPRESENTING HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Derek Schroeter	17 Jun 2020	16/904,238	12/17/2020	US 2020-0393567 A1	US	Published	17 Jun 2019	US	Non Provisional	Secondary	
D04177.1001W0001	NEAREST NEIGHBOR SEARCH USING COMPRESSED OCTREES REPRESENTING HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Derek Schroeter	17 Jun 2020	PCT/US1020/038250	12/24/2020	WO/2020/257384	PCT	Published	17 Feb 2022	US	Non Provisional	Secondary	National Phase Deadline Dec 17, 2021
D04177.1001U0502	FORMING NORMALS IN COMPRESSED OCTREES REPRESENTING HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Derek Schroeter	17 Jun 2020	16/904,259	12/17/2020	US 2020-0393268 A1	US	Published	17 Jun 2019	US	Non Provisional	Secondary	
D04177.1001U0502	CALIBRATION OF INERTIAL MEASUREMENT UNITS OF VEHICLES USING LOCALIZATION	Di Zeng, Mengta Wu	29 Jun 2020	16/915,897	12/31/2020	US 2020-0408529 A1	US	Published	27 Jun 2019	US	Non Provisional	Secondary	
D04177.1001W0001	CALIBRATION OF INERTIAL MEASUREMENT UNITS OF VEHICLES USING LOCALIZATION	Di Zeng, Mengta Wu	29 Jun 2020	PCT/US1020/040194	12/30/2020	WO/2020/264528	PCT	Published	27 Feb 2022	US	Non Provisional	Secondary	National Phase Deadline Dec 27, 2021
D04177.1001U0502	CALIBRATION OF MULTIPLE INERTIAL MEASUREMENT UNITS OF VEHICLES USING LOCALIZATION BASED ON A HIGH DEFINITION MAP	Di Zeng, Mengta Wu	25 Jun 2020	16/911,622	12/31/2020	US 2020-0408857 A1	US	Published	26 Jun 2019	US	Non Provisional	Secondary	
D04177.1001U0502	SEGMENTING GROUND POINTS FROM NON-GROUND POINTS TO ASSIST WITH LOCALIZATION OF AUTONOMOUS VEHICLES	Derek Schroeter, Di Zeng, Mengta Wu	15 Jun 2020	16/901,655	12/17/2020	US 2020-0393566 A1	US	Published	14 Jun 2019	US	Non Provisional	Secondary	
D04177.1002U0502	USING MAP-BASED CONSTRAINTS FOR DETERMINING VEHICLE TAKE OFF DETERMINATION FOR HIGH DEFINITION MAPS	Mark D. Wheeler, Derek Schroeter, Di Zeng	10 Jun 2020	16/998,005	12/10/2020	US 2020-0386555 A1	US	Published	10 Jun 2019	US	Non Provisional	Secondary	
D04177.1002U0502	USING MAP-BASED CONSTRAINTS FOR DETERMINING VEHICLE TAKE OFF DETERMINATION FOR HIGH DEFINITION MAPS	Ming Guo, Lin Yang, Dongshen Piao	11 Jun 2020	16/998,350	12/17/2020	US 2020-0393265 A1	US	Published	11 Jun 2019	US	Non Provisional	Secondary	
D04177.1002U0502	ANNOTATING HIGH DEFINITION MAP DATA WITH SEMANTIC LABELS	Lin Yang, Xiangwu Wu	02 Jul 2020	16/920,126	1/7/2021	US 2021-0204613 A1	US	Published	02 Jul 2019	US	Non Provisional	Secondary	

04177.1002W001	ANNOYATING HIGH DEFINITION MAP DATA WITH SEMANTIC LABELS	Lin Yang, Xiaqing Wu	02 Jul 2020	PCT/US2020/040789	1/7/2021	WO/2021/003453		PCT	Published		02 Mar 2022	02 Jul 2019	US	Non Provisional	Secondary
04177.1002J0502	DIRECTING BOARD REPOSITIONING DURING SENSOR CALIBRATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Zhiqiang Huang, Lin Yang	02 Jul 2020	16/920.US	1/7/2021	US 2021-0004510 A1		US	Published			05 Jul 2019	US	Non Provisional	Secondary
04177.1002J0503	ONLINE SENSOR CALIBRATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Lin Yang, Qian Gang	02 Jul 2020	16/920.141	1/7/2021	US 2021-0003684 A1		US	Published			05 Jul 2019	US	Non Provisional	Secondary
04177.1002J0504	LIDAR TO CAMERA TRANSFORMATION DURING SENSOR CALIBRATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Lin Yang, Zhengyu Zhang	02 Jul 2020	16/920.128	1/7/2021	US 2021-0003712 A1		US	Published			05 Jul 2019	US	Non Provisional	Secondary
04177.1002W001	DIRECTING BOARD REPOSITIONING DURING SENSOR CALIBRATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Zhiqiang Huang, Lin Yang	05 Jul 2020	PCT/US2020/040944	1/14/2021	WO/2021/007194		PCT	Published		05 Mar 2022	05 Jul 2019	US	Non Provisional	Secondary
04177.1002A0502	UPDATING HIGH DEFINITION MAPS BASED ON LANE CLOSURE AND LANE OPENING	Xinghui Zhang, Marlene Wan, Yinghui Yao	17 Jun 2020	16/904.604	12/17/2020	US 2020-0393261 A1		US	Published			17 Jun 2019	US	Non Provisional	Secondary
04177.1002A001	UPDATING HIGH DEFINITION MAPS BASED ON LANE CLOSURE AND LANE OPENING	Xinghui Zhang, Marlene Wan, Yinghui Yao	17 Jun 2020	PCT/US2020/038257	12/24/2020	WO/2020/257386		PCT	Published		17 Feb 2022	17 Jun 2019	US	Non Provisional	Secondary
04177.1002J0502	USING HIGH DEFINITION MAPS FOR GENERATING SYNTHETIC SCENARIOS FOR AUTONOMOUS VEHICLES	Xinghui Zhang, Gil Colgate	02 Jul 2020	16/930.125	1/7/2021	US 2021-0004017 A1		US	Published			05 Jul 2019	US	Non Provisional	Secondary
04177.1002W001	USING HIGH DEFINITION MAPS FOR GENERATING SYNTHETIC SCENARIOS FOR AUTONOMOUS VEHICLES	Xinghui Zhang, Gil Colgate	05 Jul 2020	PCT/US2020/040945	1/14/2021	WO/2021/007195		PCT	Published		05 Mar 2022	05 Jul 2019	US	Non Provisional	Secondary
04177.1002J0502	UPDATING HIGH DEFINITION MAPS BASED ON AGE OF MAPS	Francis J. Bailey, Kevin Yang	01 Jul 2020	16/918.672	1/7/2021	US 2021-0004363 A1		US	Published			02 Jul 2019	US	Non Provisional	Secondary
04177.10027U026	OCCUPANCY MAP UPDATES BASED ON SENSOR DATA COLLECTED BY AUTONOMOUS VEHICLES	Mark D. Wheeler, Xinghui Wu	23 Oct 2020	17/079.057				US	Application			30 Dec 2016	US	Non Provisional	Continuation
04177.1002J05026	LANE LINE CREATION FOR HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Yu Zhang, Lin Yang, Dongsheng Rao	08 Dec 2020	17/115.376				US	Application			30 Dec 2016	US	Non Provisional	Continuation
04177.1002J0504	HIGH DEFINITION MAP AND ROUTE STORAGE MANAGEMENT SYSTEM FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	10 Feb 2020	16/786.635	9/10/2020	US 2020-0285658 A1		US	Allowed			30 Dec 2016	US	Non Provisional	Continuation
04177.1002J05013	VISUAL ODOMETRY AND PRIORISE ALIGNMENT FOR HIGH DEFINITION MAP CREATION	Mark D. Wheeler, Chen Chen, Ronghua Zhang, Di Zeng	11 Feb 2020	16/787.469	9/10/2020	US 2020-0284581 A1	30 Mar 2021	US	Granted	30 Sep 2024	27 Dec 2037	30 Dec 2016	US	Non Provisional	Continuation
04177.1002J05061	LIDAR TO CAMERA CALIBRATION FOR GENERATING HIGH DEFINITION MAPS	Mark D. Wheeler, Lin Yang	15 Oct 2018	2018020816849	8/4/2020	CN 111462403 A		CN	Published			19 Oct 2017	US	Non Provisional	Designated PCT
04177.1002J05061	HIGH DEFINITION MAP BASED LOCALIZATION OPTIMIZATION	Mark D. Wheeler	03 Dec 2018	2018020822291	9/11/2020	CN 111655135 A		CN	Published			01 Dec 2017	US	Non Provisional	Designated PCT
04177.1002J05061	HIGH DEFINITION MAP BASED LOCALIZATION OPTIMIZATION	Mark D. Wheeler	03 Dec 2018	18885061.4				EP	Application	03 Dec 2021		01 Dec 2017	US	Non Provisional	Designated PCT
04177.1002A0504	IMPROVING ACCURACY OF GLOBAL NAVIGATION SATELLITE SYSTEM BASED POSITIONING USING HIGH DEFINITION MAP BASED LOCALIZATION	Jeffrey Minoru Adachi	23 Feb 2021	17/183.031				US	Application			22 Nov 2017	US	Non Provisional	Continuation

0417/1033CN01	ITERATIVE CLOSEST POINT PROCESS BASED ON LIDAR WITH INTEGRATED MOTION ESTIMATION FOR HIGH DEFINITION MAPS	Mark D. Wheeler, Denik Schreiner, Chen Chen, Jeffrey Minoru Adachi, Greg Combe	16 Nov 2018	201880074092.4	7/14/2020	CN 111417871 A				CN	Published				17 Nov 2017	US	Non Provisional	Designated PCT
0417/1033EP01	ITERATIVE CLOSEST POINT PROCESS BASED ON LIDAR WITH INTEGRATED MOTION ESTIMATION FOR HIGH DEFINITION MAPS	Mark D. Wheeler, Denik Schreiner, Chen Chen, Jeffrey Minoru Adachi, Greg Combe	16 Nov 2018	18879505.9						EP	Application	16 Nov 2021			17 Nov 2017	US	Non Provisional	Designated PCT
0417/1033EP01	ITERATIVE CLOSEST POINT PROCESS BASED ON LIDAR WITH INTEGRATED MOTION ESTIMATION FOR HIGH DEFINITION MAPS	Mark D. Wheeler, Denik Schreiner, Chen Chen, Jeffrey Minoru Adachi, Greg Combe	01 Mar 2019	19761697.2	1/6/2021	3759562				EP	Published	01 Mar 2022			02 Mar 2018	US	Non Provisional	Designated PCT
0417/1033US03	LOCALIZATION FOR AUTONOMOUS VEHICLES	Ronghua Zhong, Lin Yang	23 Feb 2021	17183.053						US	Application				02 Mar 2018	US	Non Provisional	Continuation
0417/1033CN01	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Wei Luo, Gil Colgate	01 Mar 2019	201980029284	1/18/2021	CN 112204343 A				CN	Published				02 Mar 2018	US	Non Provisional	Designated PCT
0417/1033EP01	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Wei Luo, Gil Colgate	01 Mar 2019	19760776.5	1/6/2021	3759432				EP	Published	01 Mar 2022			02 Mar 2018	US	Non Provisional	Designated PCT
0417/1034CN01	REMOVAL OF EPHEMERAL POINTS FROM POINT CLOUDS	Mark D. Wheeler, Chen Chen, Liang Zou, Denik Schreiner	03 Jan 2020	202010050201.6	8/10/2020	CN 111402387 A				CN	Published				03 Jan 2019	US	Non Provisional	Secondary
0417/1034US02	LOCALIZATION FOR AUTONOMOUS VEHICLES	Bosun Liu, Tian Lin, Xuehao Chen	12 Oct 2020	637090.417						US	Application			12 Oct 2021			Provisional Conversion deadline Oct 12, 2021	
0417/1033US06	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	19 Oct 2018	16785.911	4/25/2019	US 2019-0122386 A1				US	Granted	07 Jul 2023	19 Oct 2038	19 Oct 2017	US	Non Provisional	Secondary	
0417/1033US09	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	02 Jan 2020	167734.225	5/7/2020	US 2020-0145569 A1				US	Granted	19 Jul 2024	19 Oct 2038	19 Oct 2017	US	Non Provisional	Continuation	
0417/1033US03	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	15 Oct 2018	167160.026	4/25/2019	US 2019-0120947 A1				US	Granted	17 May 2024	17 Jan 2039	19 Oct 2017	US	Non Provisional	Secondary	
0417/1033US02	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	15 Oct 2018	167161.035	4/25/2019	US 2019-0120946 A1				US	Granted	08 Apr 2023	15 Oct 2038	19 Oct 2017	US	Non Provisional	Secondary	
0417/1033US07	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	12 Aug 2019	167538.802	4/16/2020	US 2020-0120253 A1				US	Published			19 Oct 2017	US	Non Provisional	Continuation	
0417/1033US04	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	18 Oct 2018	167162.224	7/13/2019	US 2019-0222736 A1				US	Granted	03 Jan 2023	16 Oct 2038	19 Oct 2017	US	Non Provisional	Secondary	
0417/1033US05	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	17 Oct 2018	167163.463	4/25/2019	US 2019-0120948 A1				US	Granted	05 May 2023	17 Oct 2038	19 Oct 2017	US	Non Provisional	Secondary	
0417/1033US08	LOCALIZATION FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Lin Yang	24 Sep 2019	167540.969	1/16/2020	US 2020-0021728 A1				US	Granted	04 Nov 2024	31 Jan 2039	19 Oct 2017	US	Non Provisional	Divisional	
0417/1033US02	LOCALIZATION FOR AUTONOMOUS VEHICLES	Ronghua Zhong, Lin Yang	01 Mar 2019	167290.658	9/5/2019	US 2019-0271549 A1				US	Granted	23 Aug 2024	21 Jul 2039	02 Mar 2018	US	Non Provisional	Secondary	
0417/1028CN01	VECTOR DATA ENCODING FOR HIGH DEFINITION MAP DATA FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	28 Dec 2017	201780085909.3	3/6/2020	CN 110859981A				CN	Published				30 Dec 2016	US	Non Provisional	Designated PCT
0417/1028US03	VECTOR DATA ENCODING FOR HIGH DEFINITION MAP DATA FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, LinYang	28 Dec 2017	157957.417	7/5/2018	US 2018-0192059 A1				US	Granted	03 Mar 2023	25 Jan 2038	30 Dec 2016	US	Non Provisional	Secondary	
0417/1028US02	VECTOR DATA ENCODING FOR HIGH DEFINITION MAP DATA FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	28 Dec 2017	157957.383	7/5/2018	US 2018-0188372 A1				US	Granted	23 Jan 2023	28 Dec 2037	30 Dec 2016	US	Non Provisional	Secondary	
0417/1028CN02	SIGN AND LANE CREATION FOR HIGH DEFINITION MAPS	Mark D. Wheeler, Ming Cai, Yu Zhang, Lin Yang, Dongzheng Piao, Derek Thomas Miller, Jianxin Shen, Wang	29 Dec 2017	201780086388.3						CN	Application				30 Dec 2016	US	Non Provisional	Designated PCT
0417/1033CN03	ALIGNMENT OF DATA CAPTURED BY AUTONOMOUS VEHICLES TO GENERATE HIGH DEFINITION MAPS	Mark D. Wheeler, Denik Schreiner, Chen Chen, Liang Zou, Jeffrey Minoru Adachi, Gregory Combe	28 Dec 2017	201780086520.0	2/21/2020	CN 110832279A				CN	Published				30 Dec 2016	US	Non Provisional	Designated PCT

0417/1.10330US29	DISTRIBUTED PROCESSING OF POSE GRAPHS FOR GENERATING HIGH DEFINITION MAPS FOR NAVIGATING AUTONOMOUS VEHICLES	Donk Schroeter, Chen Chen, Gregory Coombe, Tom Wang	28 Dec 2017	15/857,606	7/5/2018	US 2018-0188040 A1	23 Apr 2019	10,267,634	US	Granted	23 Oct 2022	28 Dec 2037	30 Dec 2016	US	Non Provisional	Secondary	
0417/1.10330US28	DETECTION OF MISALIGNMENT OF POSE GRAPHS FOR HIGH DEFINITION MAPS FOR NAVIGATING AUTONOMOUS VEHICLES	Mark D. Wheeler, Chen Chen, Liang Zu	28 Dec 2017	15/857,609	7/5/2018	US 2018-0188041 A1			US	Published			30 Dec 2016	US	Non Provisional	Secondary	Final Office Action Response due Aug 12, 2021
0417/1.10330US27	POSE GRAPHS FOR INCREMENTAL UPDATES OF POSE GRAPHS FOR GENERATING HIGH DEFINITION MAPS FOR NAVIGATING AUTONOMOUS VEHICLES	Chen Chen, Tom Wang	28 Dec 2017	15/857,611	7/5/2018	US 2018-0188042 A1	23 Apr 2019	10,267,635	US	Granted	23 Oct 2022	28 Dec 2037	30 Dec 2016	US	Non Provisional	Secondary	
0417/1.10280US26	TRAFFIC SIGN FEATURE CREATION FOR HIGH DEFINITION MAPS USED FOR NAVIGATING AUTONOMOUS VEHICLES	Mark D. Wheeler, Yu Zhang, Lin Yang, Derek Thomas Miller, Joseph Stephen Max	29 Dec 2017	15/859,482	7/5/2018	US 2018-0188060 A1	02 Jun 2020	10,657,416	US	Granted	02 Dec 2023	04 Jun 2038	30 Dec 2016	US	Non Provisional	Secondary	
0417/1.10330US25	ALIGNMENT OF DATA CAPTURED BY AUTONOMOUS VEHICLES TO GENERATE HIGH DEFINITION MAPS	Chen Chen, Jeffrey Coombe, Jeff Adachi, Tom Wang	28 Dec 2017	15/857,602	7/5/2018	US 2018-0188039 A1	05 Mar 2019	10,222,211	US	Granted	05 Sep 2022	28 Dec 2037	30 Dec 2016	US	Non Provisional	Secondary	
0417/1.10330US10	CLASSIFICATION OF SURFACES AS HARD/SOFT FOR COMBINING DATA CAPTURED BY AUTONOMOUS VEHICLES FOR GENERATING HIGH DEFINITION MAPS	Chen Chen, Gregory Coombe	28 Dec 2017	15/857,612	7/5/2018	US 2018-0188043 A1	07 Jan 2020	10,527,417	US	Granted	07 Jul 2023	10 Mar 2038	30 Dec 2016	US	Non Provisional	Secondary	
0417/1.10330US12	CLASSIFICATION OF SURFACES AS HARD/SOFT FOR COMBINING DATA CAPTURED BY AUTONOMOUS VEHICLES FOR GENERATING HIGH DEFINITION MAPS	Chen Chen, Gregory Coombe	17 Dec 2019	16/748,172	7/16/2020	US 2020-023603 A1			US	Published			30 Dec 2016	US	Non Provisional	Continuation	Non final Office Action Response due June 10, 2021 (with one-month extension)
0417/1.10370US2	VISUALIZATION OF HIGH DEFINITION MAP DATA	Mark D. Wheeler, Wei Luo, Gal Colgate	01 Mar 2019	16/790,480	9/5/2019	US 2019-0274559 A1			US	Published			02 Mar 2018	US	Non Provisional	Secondary	
0417/1.10330US22	AUGMENTATION OF GLOBAL NAVIGATION SATELLITE SYSTEM BASED DATA	Mark D. Wheeler, Chen Chen, Di Zeng, Greg Coombe, Jeff Adachi	09 Sep 2019	16/964,403	3/12/2020	US 2020-0081134 A1			US	Published			07 Sep 2018	US	Non Provisional	Secondary	
0417/1.10330US22	ACCURACY OF GLOBAL NAVIGATION SATELLITE SYSTEM BASED POSITIONING USING HIGH DEFINITION MAPS FOR LOCALIZATION	Jeffrey Minoru Adachi	21 Nov 2018	16/798,324	5/23/2019	US 2019-0154842 A1	07 Jan 2020	10,527,734	US	Granted	07 Jul 2023	21 Nov 2038	22 Nov 2017	US	Non Provisional	Secondary	
0417/1.10330US23	ACCURACY OF GLOBAL NAVIGATION SATELLITE SYSTEM BASED POSITIONING USING HIGH DEFINITION MAPS FOR LOCALIZATION	Jeffrey Minoru Adachi	06 Jan 2020	16/735,621	7/23/2020	US 2020-0233095 A1	23 Feb 2021	10,928,523	US	Granted	23 Aug 2024	21 Nov 2038	22 Nov 2017	US	Non Provisional	Continuation	
0417/1.10330US22	ITERATIVE CLOSEST POINT PROCESS BASED ON LIDAR WITH INTEGRATED MOTION ESTIMATION FOR HIGH DEFINITION MAPS FOR LOCALIZATION	Mark D. Wheeler, Denik Schreiner, Chen Chen, Jeffrey Minoru Adachi, Greg Coombe	16 Nov 2018	16/794,226	7/19/2019	US 2019-0219700 A1			US	Published			17 Nov 2017	US	Non Provisional	Secondary	
0417/1.10330US24	LANE LINE CREATION FOR HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Yu Dongchang Piao	29 Dec 2017	15/859,194	7/5/2018	US 2018-0188059 A1	08 Dec 2020	10,853,395	US	Granted	08 Jan 2024	14 Aug 2038	30 Dec 2016	US	Non Provisional	Secondary	
0417/1.10280US25	LANE NETWORK CONSTRUCTION USING HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Ming Cui, Lin Yang	29 Dec 2017	15/859,202	7/5/2018	US 2018-0188578 A1	28 Jan 2020	10,545,029	US	Granted	28 Jul 2023	22 Jul 2038	30 Dec 2016	US	Non Provisional	Secondary	
0417/1.10280US27	ENCODING LIDAR SCANNED DATA FOR GENERATING HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Mark D. Wheeler, Lin Yang	29 Jul 2019	16/524,696	4/16/2020	US 2020-0168855 A1			US	Published			30 Dec 2016	US	Non Provisional	Continuation	
0417/1.10330US22	HIGH DEFINITION MAP BASED LOCALIZATION OPTIMIZATION	Mark D. Wheeler	03 Dec 2018	16/708,026	7/4/2019	US 2019-0204092 A1			US	Published			01 Dec 2017	US	Non Provisional	Secondary	Final Office Action Response due July 14, 2021
0417/1.10330US22	NAVIGABLE BOUNDARY GENERATION FOR AUTONOMOUS VEHICLES	Lin Yang, Derek Miller	19 Dec 2019	16/721,316	6/25/2020	US 2020-020547 A1			US	Published			19 Dec 2018	US	Non Provisional	Secondary	

0417/1004052	REMOVAL OF EPHEMERAL POINTS FROM POINT CLOUD OF A HIGH-DEFINITION MAP FOR NAVIGATING AUTONOMOUS VEHICLES	Mark D. Wheeler, Chen Chen, Liang Zou, Deng Shrester	02 Jan 2020	16/733,443	7/9/2020	US 2020-021964 A1		US	Published				09 Jan 2019	US	Non Provisional	Secondary	
0417/1003601	HIGH DEFINITION MAP AND ROUTE STORAGE MANAGEMENT SYSTEM FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	28 Dec 2017	201780086771.9	3/24/2020	CN 110914777A		CN	Published				30 Dec 2016	US	Non Provisional	Designated PCT	
0417/10028P01	HIGH DEFINITION MAP AND ROUTE STORAGE MANAGEMENT SYSTEM FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	28 Dec 2017	17887871.15	11/6/2019	3563205		EP	Published	28 Dec 2021			30 Dec 2016	US	Non Provisional	Designated PCT	Annually Deadline Dec 28, 2021
0417/10029U52	HIGH DEFINITION MAP AND ROUTE STORAGE MANAGEMENT SYSTEM FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	28 Dec 2017	15/957,658	7/5/2018	US 2018-018942.9 A1	16 Jul 2019	US	Granted	16 Jan 2023	28 Dec 2037		30 Dec 2016	US	Non Provisional	Secondary	
0417/10029U53	HIGH DEFINITION MAP AND ROUTE STORAGE MANAGEMENT SYSTEM FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	09 May 2019	15/968,270	8/28/2019	US 2019-036517.9 A1	25 Feb 2020	US	Granted	25 Aug 2023	28 Dec 2037		30 Dec 2016	US	Non Provisional	Continuation	
0417/10035K02	ENRICHMENT OF POINT CLOUD DATA FOR HIGH-DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Lin Yang	27 Dec 2017	201780085792.9	2/21/2020	CN 110832348 A		CN	Published				30 Dec 2016	US	Non Provisional	Designated PCT	
0417/10030U54	ENRICHMENT OF POINT CLOUD DATA FOR HIGH-DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Lin Yang	27 Dec 2017	15/955,547	7/5/2018	US 2018-0190016 A1	24 Sep 2019	US	Granted	24 Mar 2023	27 Dec 2037		30 Dec 2016	US	Non Provisional	Secondary	
0417/10030U55	ENRICHMENT OF POINT CLOUD DATA FOR HIGH-DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Lin Yang	27 Dec 2017	15/955,357	7/5/2018	US 2018-0188038 A1	17 Nov 2020	US	Granted	17 Mar 2024	18 Apr 2039		30 Dec 2016	US	Non Provisional	Secondary	
0417/10035K01	VISUAL ODOMETRY AND PAIRWISE ALIGNMENT FOR HIGH DEFINITION MAP CREATION	Mark D. Wheeler, Chen Chen, Ronghua Zhong, Di Zeng	27 Dec 2017	201780085785.9				CN	Application				30 Dec 2016	US	Non Provisional	Designated PCT	
0417/10030U53	VISUAL ODOMETRY AND PAIRWISE ALIGNMENT FOR HIGH DEFINITION MAP CREATION	Mark D. Wheeler, Ronghua Zhong	27 Dec 2017	15/955,144	7/5/2018	US 2018-0188027 A1	04 Jun 2019	US	Granted	04 Dec 2022	27 Dec 2037		30 Dec 2016	US	Non Provisional	Secondary	
0417/10030U11	VISUAL ODOMETRY AND PAIRWISE ALIGNMENT FOR HIGH DEFINITION MAP CREATION	Mark D. Wheeler, Chen Chen, Ronghua Zhong, Di Zeng	30 May 2019	16/427,037	9/11/2019	US 2019-027763.1 A1	24 Mar 2020	US	Granted	24 Sep 2023	27 Dec 2037		30 Dec 2016	US	Non Provisional	Continuation	
0417/10030U52	VISUAL ODOMETRY AND PAIRWISE ALIGNMENT FOR HIGH DEFINITION MAP CREATION	Mark D. Wheeler, Chen Chen, Ronghua Zhong, Di Zeng	27 Dec 2017	15/955,116	7/5/2018	US 2018-0188026 A1	04 Jun 2019	US	Granted	04 Dec 2022	27 Dec 2037		30 Dec 2016	US	Non Provisional	Secondary	
0417/10037U53	REVERSE RENDERING OF AN IMAGE BASED ON HIGH DEFINITION MAP DATA	Mark D. Wheeler, Gil Colgate	01 Mar 2019	16/290,489	9/5/2019	US 2019-027154.9 A1		US	Allowed				02 Mar 2018	US	Non Provisional	Secondary	Deadline to file a divisional or continuation Jun 21, 2021
0417/10035K01	ROUTE GENERATION USING HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	22 Dec 2017	201780087295.2	2/21/2020	CN 110832417A		CN	Published				30 Dec 2016	US	Non Provisional	Designated PCT	
0417/10031U52	REPRESENTING NAVIGABLE SURFACE BOUNDARIES OF LAMES IN HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	22 Dec 2017	15/953,033	7/5/2018	US 2018-0188742 A1	12 Nov 2019	US	Granted	12 Mar 2024	22 Dec 2037		30 Dec 2016	US	Non Provisional	Secondary	
0417/10031U53	ROUTE GENERATION USING HIGH DEFINITION MAPS FOR AUTONOMOUS VEHICLES	Mark D. Wheeler	22 Dec 2017	15/953,614	7/5/2018	US 2018-0188743 A1	24 Nov 2020	US	Granted	24 May 2024	11 Oct 2038		30 Dec 2016	US	Non Provisional	Secondary	
0417/10037U54	SEMANTIC LABEL BASED FILTERING OF OBJECTS IN AN IMAGE GENERATED FROM HIGH DEFINITION MAP DATA	Mark D. Wheeler, Gil Colgate	01 Mar 2019	16/290,564	9/5/2019	US 2019-027155.4 A1		US	Published				02 Mar 2018	US	Non Provisional	Secondary	
0417/10027K01	HIGH DEFINITION MAP UPDATES	Mark D. Wheeler, Xiang Wu, Wei Luo	29 Dec 2017	201780085924.8	2/21/2020	CN 110832474A A		CN	Published				30 Dec 2016	US	Non Provisional	Designated PCT	
0417/10027P01	HIGH DEFINITION MAP UPDATES	Mark D. Wheeler, Xiang Wu, Wei Luo	29 Dec 2017	17888334.4	11/6/2019	3563205		EP	Allowed	29 Dec 2021			30 Dec 2016	US	Non Provisional	Designated PCT	European Validation due Sept 2, 2021, Annually Deadline Dec 28, 2021

04177.100270502	HIGH DEFINITION MAP UPDATES BASED ON SENSOR DATA COLLECTED BY AUTONOMOUS VEHICLES	Mark D. Wheeler, Xiangping Wu, Wei Luo	29 Dec 2017	15/859,011	7/5/2018	US 2018-0180045 A1	06 Oct 2020	10,794,111	US	Granted	05 Apr 2024	13 Dec 2038	30 Dec 2016	US	Non Provisional	Secondary
04177.100270504	HIGH DEFINITION MAP UPDATES WITH VEHICLE DATA LOAD BALANCING	Mark D. Wheeler	29 Dec 2017	15/858,987	7/5/2018	US 2018-0180044 A1	01 Oct 2019	10,419,194	US	Granted	01 Apr 2023	22 Mar 2038	30 Dec 2016	US	Non Provisional	Secondary
04177.100270505	HIGH DEFINITION MAP UPDATES WITH VEHICLE DATA LOAD BALANCING	Mark D. Wheeler	17 Aug 2019	16/543,513	12/5/2019	US 2019-0388992 A1	13 Oct 2020	10,801,945	US	Granted	13 Apr 2024	29 Dec 2037	30 Dec 2016	US	Non Provisional	Continuation
04177.100270503	HIGH DEFINITION MAP UPDATES BASED ON SENSOR DATA COLLECTED BY AUTONOMOUS VEHICLES	Mark D. Wheeler, Xiangping Wu	29 Dec 2017	15/859,014	7/5/2018	US 2018-0180037 A1	27 Oct 2020	10,516,346	US	Granted	27 Apr 2024	15 Dec 2038	30 Dec 2016	US	Non Provisional	Secondary
	Large-scale distributed high-precision map data processing system		07 Apr 2020	202010265498X					CN	Pending				CN	Invention	
	Lane Assist System Based on UDAR Positioning		20 Oct 2020	2020111258012					CN	Pending				CN	Invention	
	Private cluster version of high-precision map processing system		21 Oct 2020	2020111202558					CN	Pending				CN	Invention	
	A high-precision ADX map data processing system for level autonomous driving		26 Oct 2020	2020111568911					CN	Pending				CN	Invention	
	Sensor calibration software		02 Apr 2020				26 May 2020	5387242	CN	Granted				CN	Utility Model	
	Map data trading system		02 Apr 2020				26 May 2020	5387234	CN	Granted				CN	Utility Model	
	High-precision map point cloud data alignment software		02 Apr 2020				26 May 2020	5388310	CN	Granted				CN	Utility Model	
	Fingerprint-based map update system		02 Apr 2020				26 May 2020	5387656	CN	Granted				CN	Utility Model	
	Fast multi-type data quality assessment software		02 Apr 2020				26 May 2020	5387786	CN	Granted				CN	Utility Model	
	Car-level advanced driving assistance system map construction method		09 Dec 2020				25 Jan 2021	6859956	CN	Granted				CN	Utility Model	
	Multiplayer and multi-engineering map editing tool software		09 Dec 2020				25 Jan 2021	6859957	CN	Granted				CN	Utility Model	
	High-precision map raw data management software		09 Dec 2020				25 Jan 2021	6853622	CN	Granted				CN	Utility Model	
	Software continuous integration and continuous deployment management platform		09 Dec 2020				25 Jan 2021	6863068	CN	Granted				CN	Utility Model	
	Data processing process automation management software		09 Dec 2020				25 Jan 2021	6848557	CN	Granted				CN	Utility Model	
	Private cluster version of high-precision map data processing system		09 Dec 2020				25 Jan 2021	6848558	CN	Granted				CN	Utility Model	
	Car data collection software		28 Dec 2020				09 Feb 2021	6961003	CN	Granted				CN	Utility Model	
	Lane Assist System Based on UDAR Positioning		28 Dec 2020				10 Feb 2021	6967136	CN	Granted				CN	Utility Model	
	Multi-functional 3D simulation display software		28 Dec 2020				09 Feb 2021	6965772	CN	Granted				CN	Utility Model	
	Map data review tool software		28 Dec 2020				09 Feb 2021	6965771	CN	Granted				CN	Utility Model	